

# Updates on FE Deformation Studies

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# New Standard Design with Short Strips

- TPG strip located under sensor
  - ▶ used to be between sensor and hybrid
  - ▶ heat from chips has to go through sensor
    - ▶ same principle as in Long Contact Design
  - ▶ Better symmetry wrt. to deformation
- Hybrid made of ,top-secret' material
  - ▶ Endicott Corel-Z
    - ▶ Google search yields exactly zero results
  - ▶ CTE is tuneable
    - ▶  $3\text{e-}6/^{\circ}\text{C}$  measured by CERN
  - ▶ Assume similar mechanical properties as for G10
- TPG strip still not modelled correctly
  - ▶ Material properties of TPG not really well known
  - ▶ Increased stability due to epoxy pillars is still neglected
    - ▶ working on a detailed FE calculation of the TPG strip
    - ▶ Influence of epoxy pillars probably negligible

# New Standard Design with Short Strips cont.

I-DEAS 12 NX Series m3: DESY : D:\IDEAS\_WORK\StandardDouble02.mf1

25-Jan-11 11:36:42

Database: D:\IDEAS\_WORK\StandardDouble02.mf1

View : No stored Workb\_View

Task : Post Processing

Model: FEM2 - Just Module

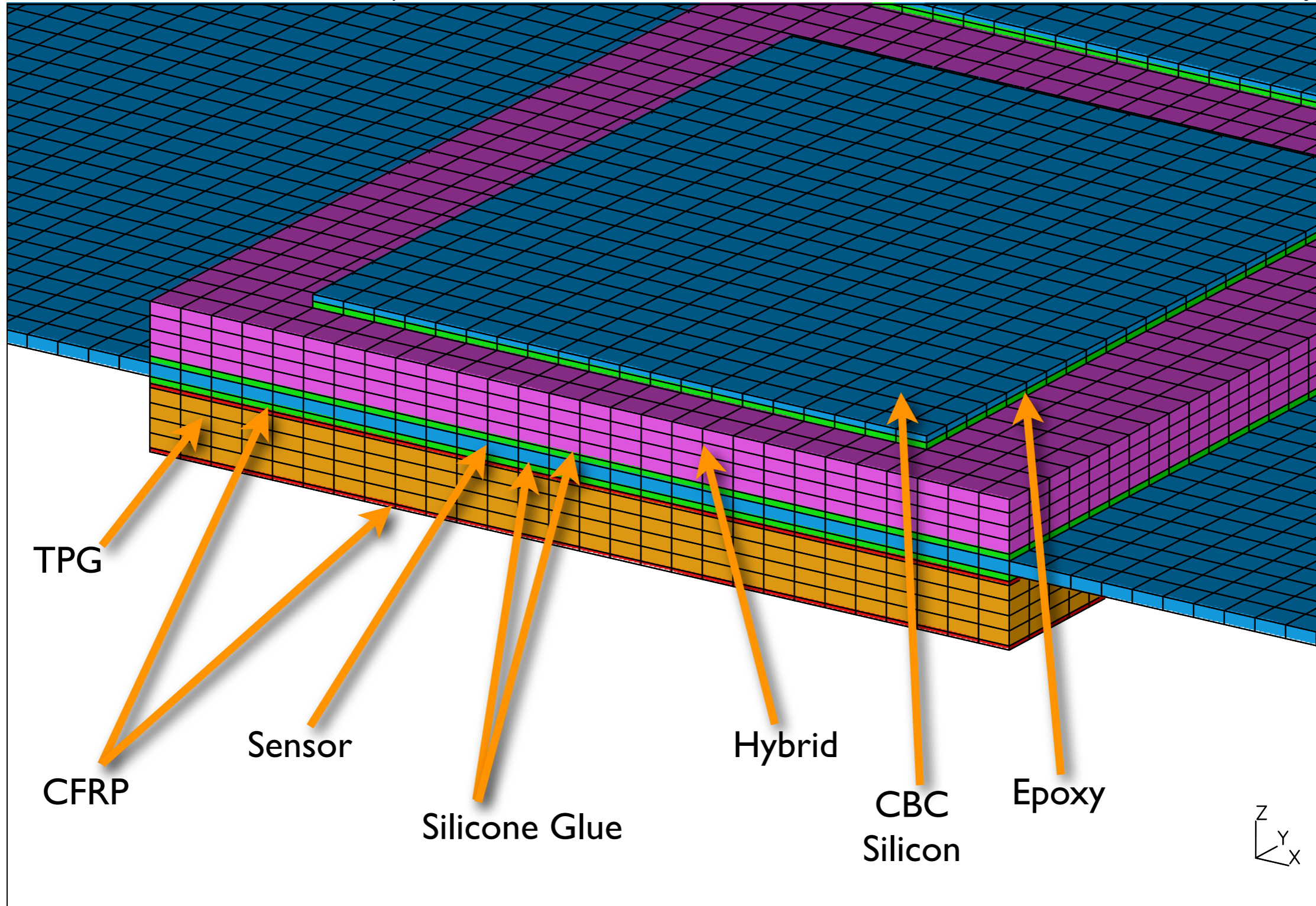
Active Study: DEFAULT FE STUDY

Units : MM

Display : No stored Option

Model/Part Bin: Quarter

Parent Part: Module FEPart Full Cooling



# New Standard Design with Short Strips cont.

I-DEAS 12 NX Series m3: DESY : D:\IDEAS\_WORK\StandardDouble02.mf1

25-Jan-11 11:38:30

Database: D:\IDEAS\_WORK\StandardDouble02.mf1

View : No stored Workb\_View

Task : Post Processing

Model: FEM5 - No CO2 Flex

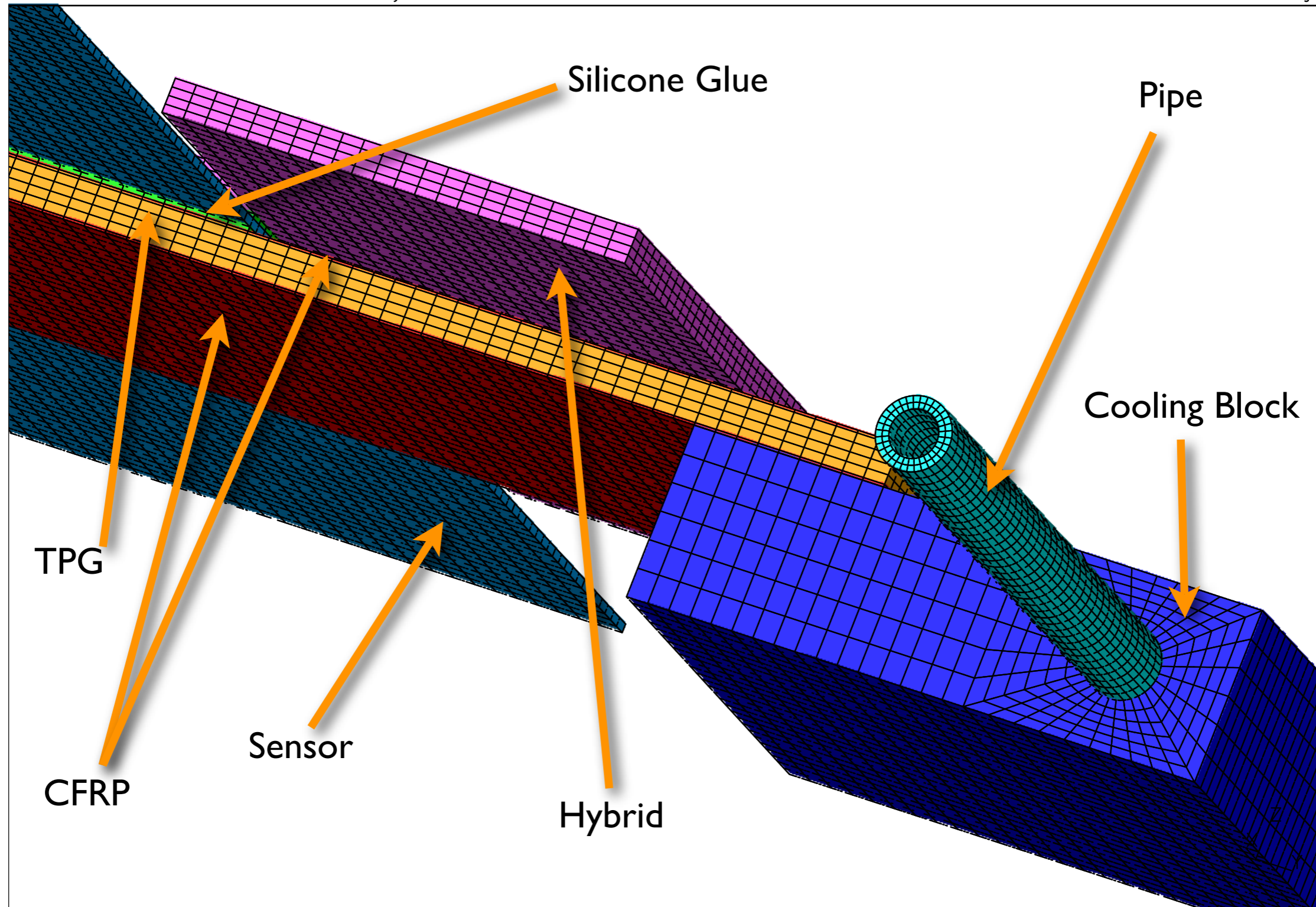
Active Study: DEFAULT FE STUDY

Units : MM

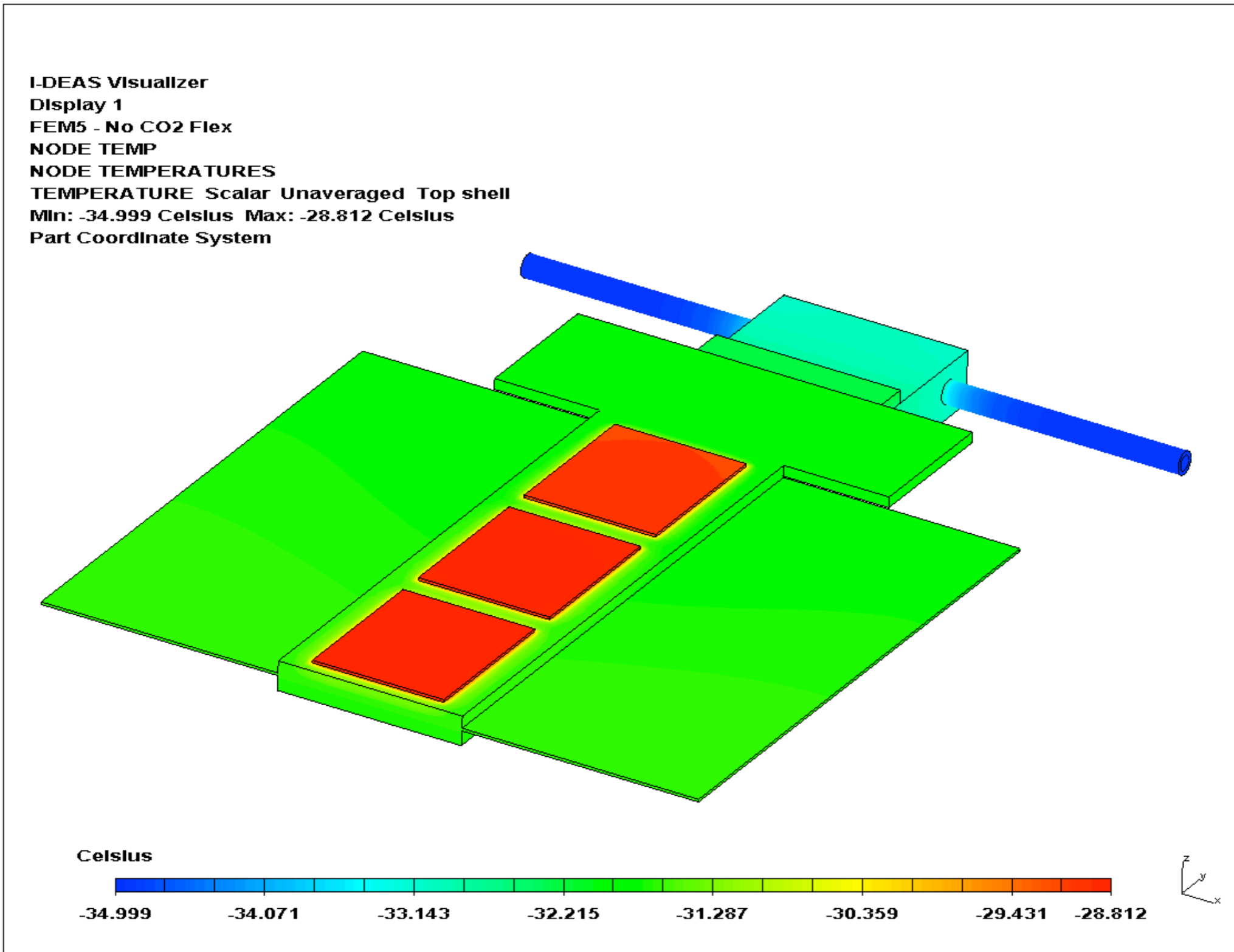
Display : No stored Option

Model/Part Bin: Quarter

Parent Part: Module FEPart Full Cooling

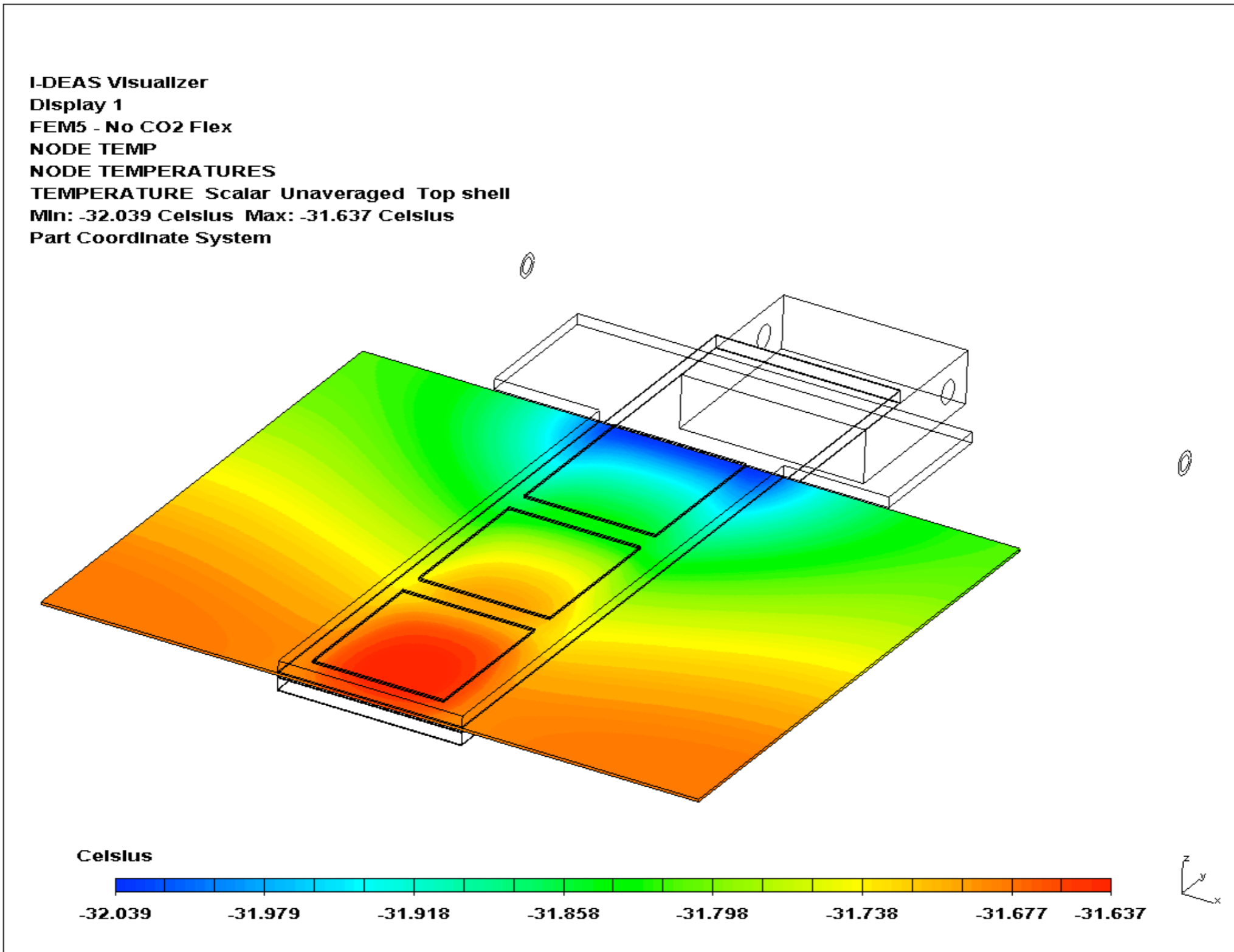


# Thermal Results - Full Module



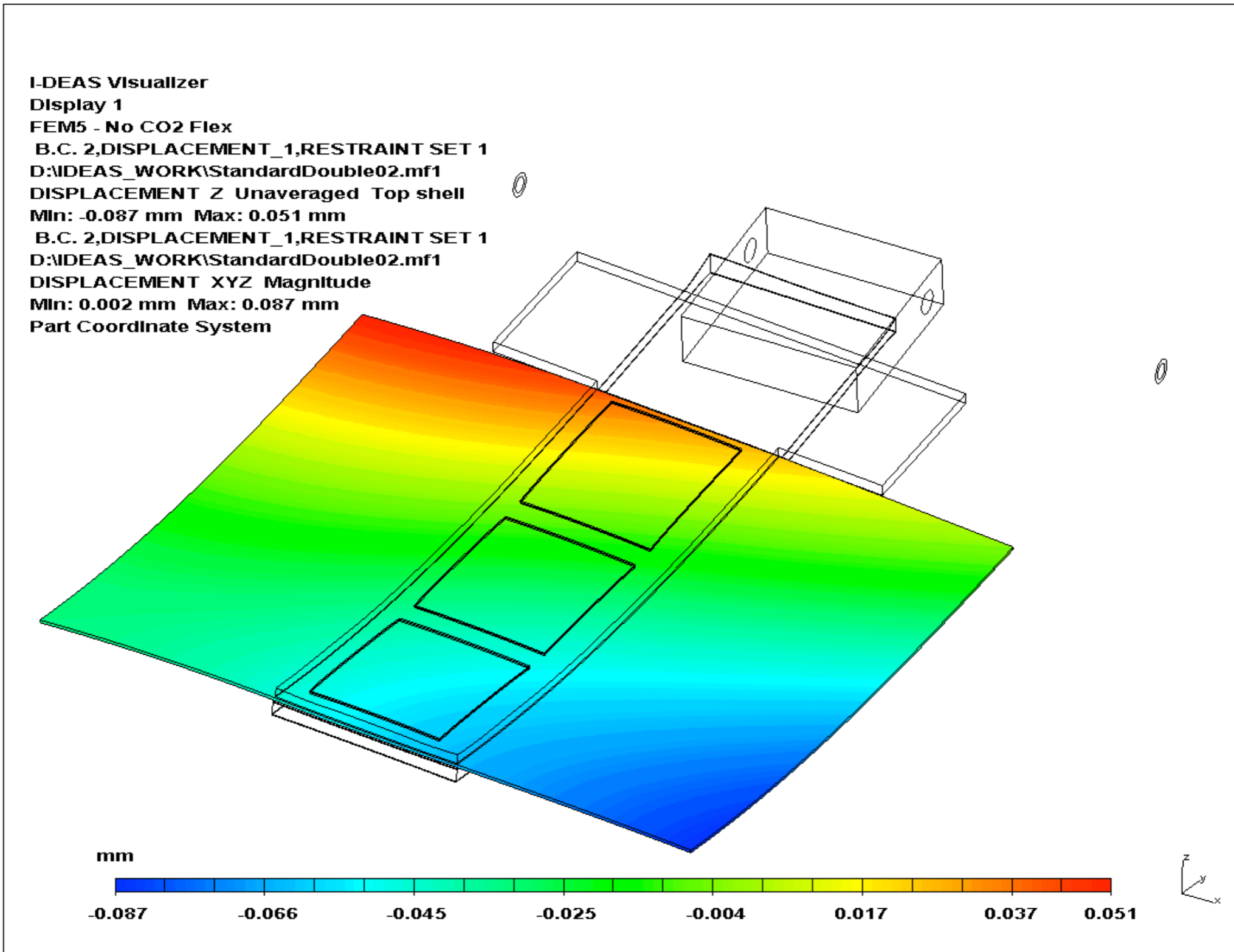
- Results from thermal calculation is used in deformation analysis
  - Temperatures on nodes mapped to nodes as thermal constraint

# Thermal Results - Sensor



- Results from thermal calculation is used in deformation analysis
  - Temperatures on nodes mapped to nodes as thermal constraint

# Deformation Results - Sensor



- Cooling block movable wrt. module along Y axis (long hole)

# Deformation Results - Full Module

I-DEAS Visualizer

Display 1

FEM5 - No CO2 Flex

B.C. 2,DISPLACEMENT\_1,RESTRAINT SET 1

D:\IDEAS\_WORK\StandardDouble02.mf1

DISPLACEMENT Z Unaveraged Top shell

Min: -0.087 mm Max: 0.125 mm

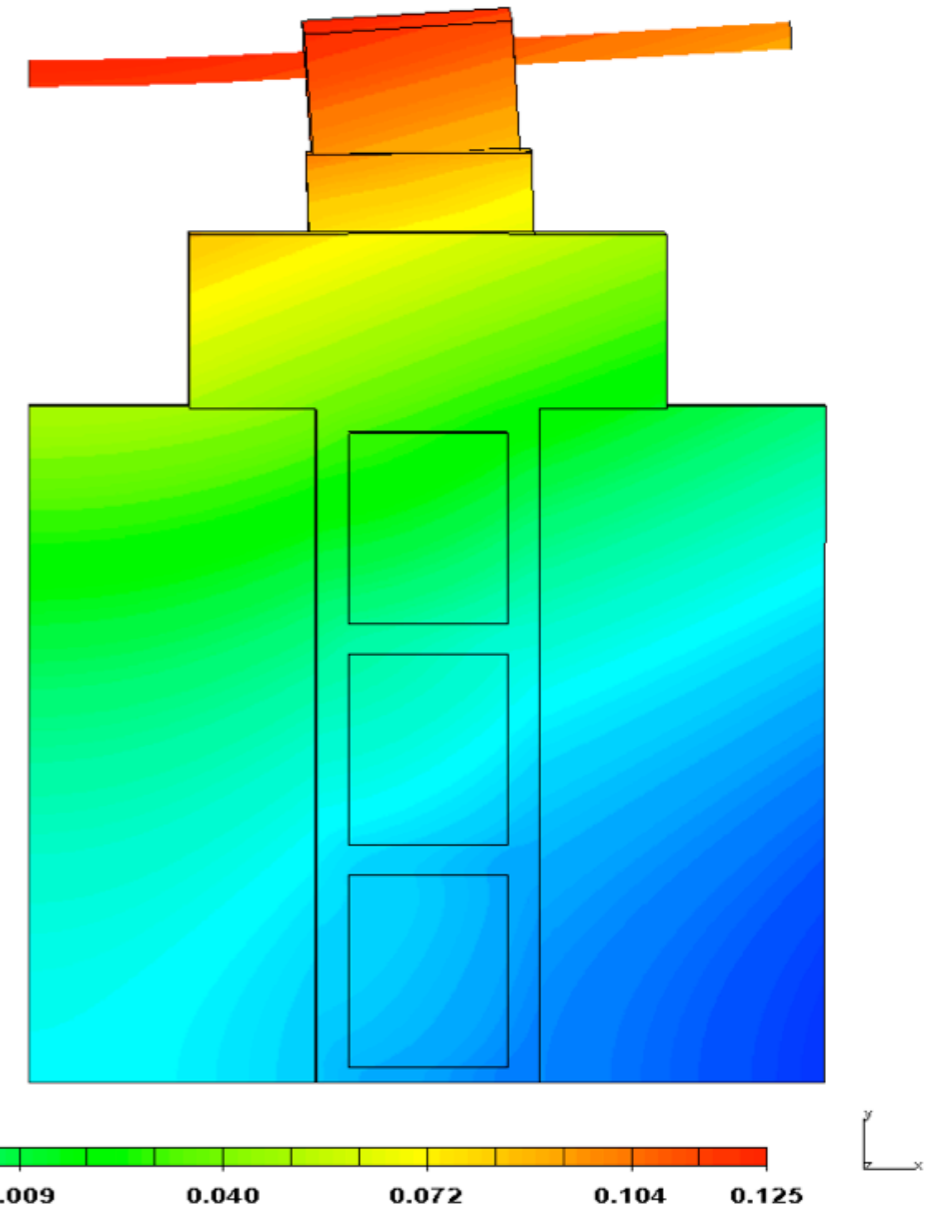
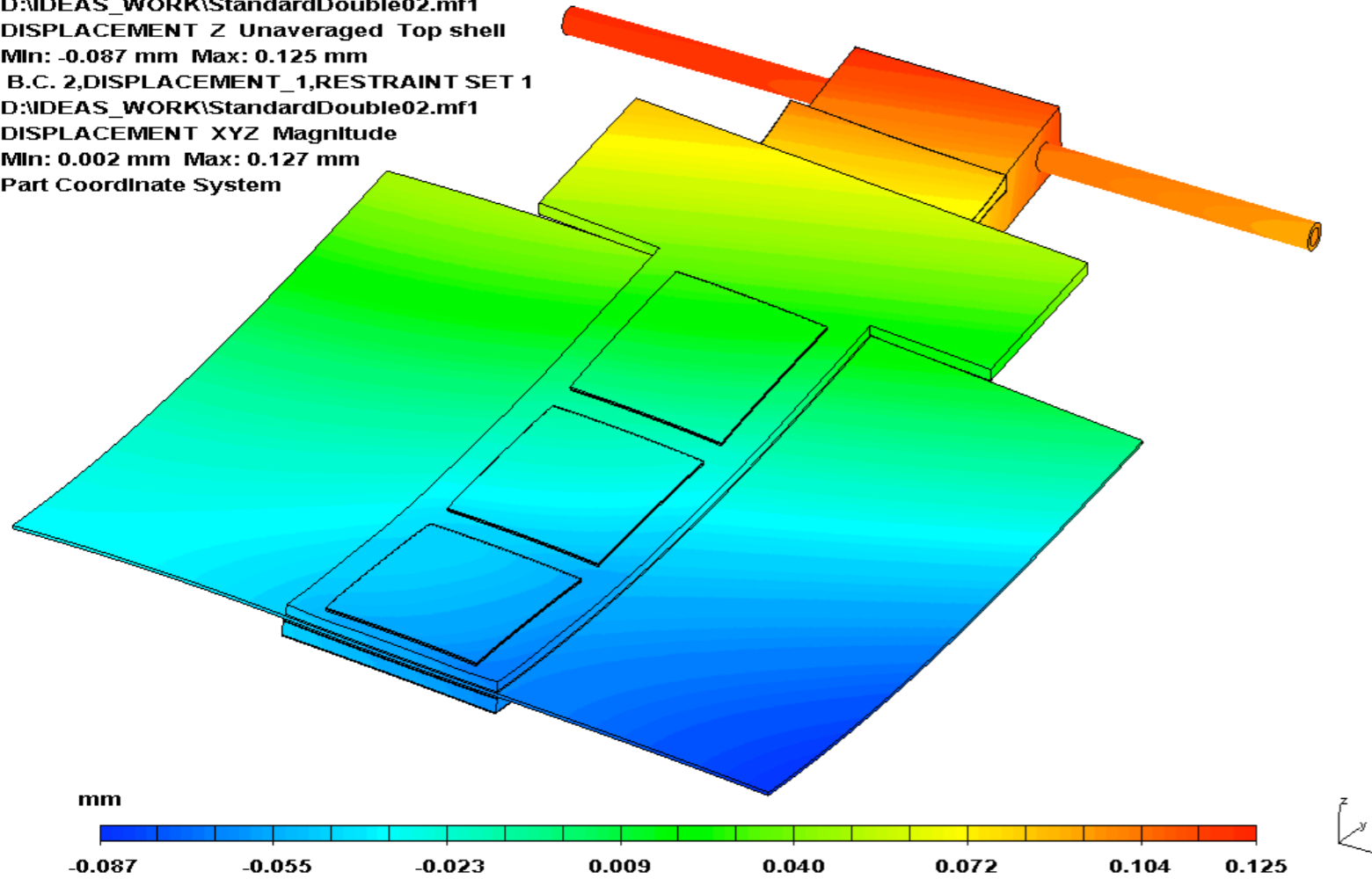
B.C. 2,DISPLACEMENT\_1,RESTRAINT SET 1

D:\IDEAS\_WORK\StandardDouble02.mf1

DISPLACEMENT XYZ Magnitude

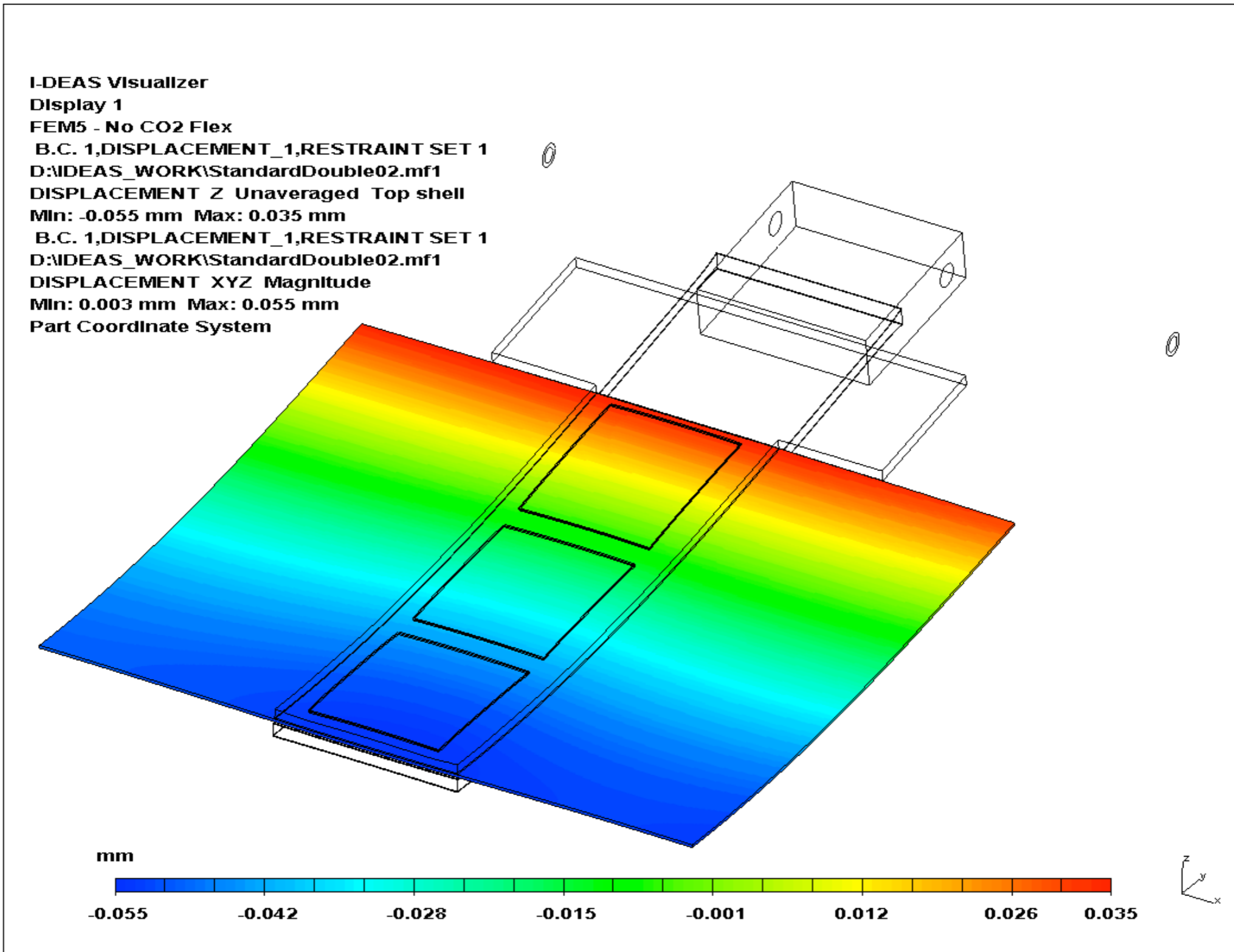
Min: 0.002 mm Max: 0.127 mm

Part Coordinate System



- Cooling block movable wrt. module along Y axis (long hole)

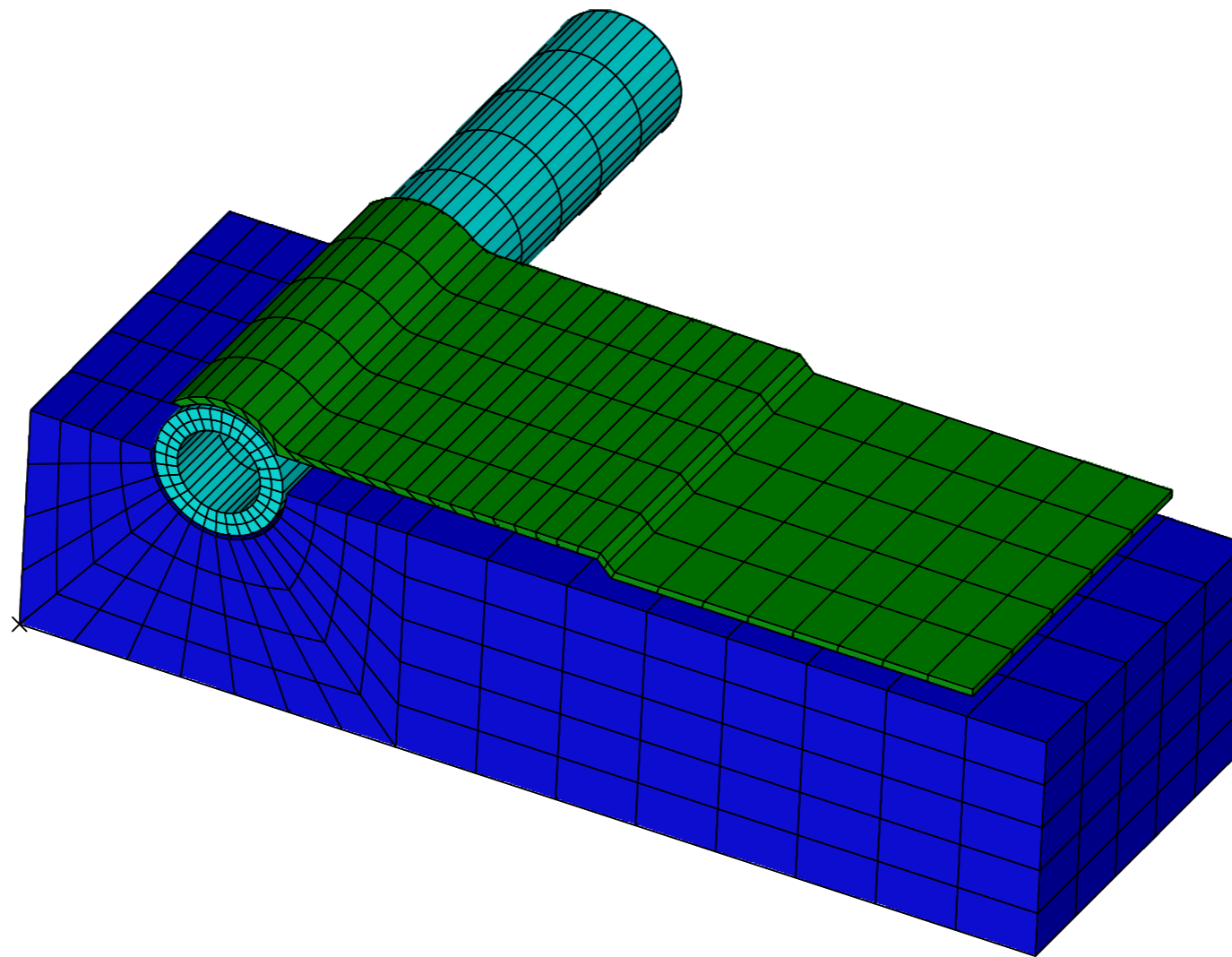
# Deformation Results - Sensor



- Cooling block movable wrt. module along X and Y axis

# Next Steps

- Continue study of TPG strip
- Repeat deformation calculations for new standard design module
  - ▶ Rigid connection between TPG strip and cooling block
  - ▶ Allow for movement of pipe wrt. cooling block



- Use deformation results as input to thermal calculation